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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,296	12/21/2001	Christopher J. Stepanian	ASPEN 113 US	9746
7590 05/28/2004			EXAMINER	
Bruce F. Jacobs P.O. Box 390438 Cambridge, MA 02139			BOYD, JENNIFER A	
			ART UNIT	PAPER NUMBER
			1771	

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/034,296

Applicant(s)

STEPANIAN ET AL.

Examiner

Jennifer A Boyd

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The Applicant's Amendments and Accompanying Remarks, filed March 8, 2004, have been entered and have been carefully considered. Claims 1, 10, 12, 19, 34, 26 and 38 are amended and claims 1 – 48 are pending. In view of Applicant's Amendment requiring that the "aerogel is not forming by joining together of aerogel particles or granules in a binder", the Examiner withdraws all previously set forth rejections as detailed in paragraphs 5 – 9 of the previous Office Action mailed July 16, 2003. However, after an updated search, additional prior art has been found which renders the invention as currently claimed unpatentable for reasons herein below.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Objections***

3. Claims 19 and 45 – 46 are objected to because of the following informalities: please remove the hyphen from the words "degrada-tion" in claim 19 and "environ-ment" in claims 45 - 46. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

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pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 12, 19 and 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Claims 2 – 11, 13 – 18, 20 – 37 and 39 – 48 are rejected as being dependent on rejected claims 1, 12, 19 and 38. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The phrase “the aerogel monolith is not formed by a joining together of aerogel particles or granules in a binder” is new matter, because this negative limitation is not literally supported by the specification. *Ex Parte Grasselli*, 231 USPQ 393. There is no mention in the specification that a binder **cannot** be used in conjunction with the aerogel particles or granules.

6. Claims 34 and 36 are indefinite because it is unclear whether the heat sink and the device which converts the thermal energy to electrical energy are being claimed and a part of the system. It is suggested to the Applicant to positively recite that the heat sink and the device are a part of the system by claiming the combination within the body of the claim rather than the preamble. As currently claimed, the claims appear to reflect intended use.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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8. Claims 1 – 3 and 7 – 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Ramamurthi et al. (US 5,306,555).

Ramamurthi is directed to an aerogel matrix composite (Title).

As to claim 1, Ramamurthi teaches a gel matrix of monolithic aerogels reinforced with long or short fibers, whiskers, mineral wool, glass wool and particles (column 4, lines 1 – 20). Ramamurthi teaches the fibers may be randomly distributed or oriented and in the form of mats, sheets or nonwoven among other forms (column 4, lines 25 – 40). Ramamurthi notes that the composite gel matrix has good rigidity or flexibility based on the required application (column 2, lines 1 – 15).

As to claims 2 and 3, Ramamurthi teaches that the aerogel matrix can comprise inorganic gel forming material such as  $\text{TiO}_2$  (titania),  $\text{SiO}_2$  (silica) and  $\text{ZrO}_2$  (zirconia).

As to claims 7 and 8, Ramamurthi teaches that the matrix also contains  $\text{TiO}_2$  (titania) pigment (column 4, lines 18 – 20), which can function as Applicant's "dopant".

### ***Claim Rejections - 35 USC § 102/103***

9. Claim 5 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ramamurthi et al. (US 5,306,555).

Although Ramamurthi does not explicitly teach the claimed fibers having a thermal conductivity of less than 50 mW/mK as required by claim 5 is inherent to Ramamurthi. Support for said presumption is found in the use of like materials (i.e. lofted batting with aerogel material and carbon microfibers) which would result in the claimed property. The burden is upon the

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Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently above claimed properties would obviously have been present once the Ramamurthi product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to providing of this rejection made above under 35 USC 102.

As to claim 5, it should be noted that the transitional phrase “consisting essentially of” limits the scope of a claim to the specified materials or steps “and those that do not materially affect the basic and novel characteristic(s)” of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). The burden is upon the Applicant to show that the additional components do affect the basic and novel characteristics of the invention. For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, “consisting essentially of” will be construed as equivalent to “comprising.” See MPEP 2111.03.

#### ***Claim Rejections - 35 USC § 103***

10. Claims 6 and 9 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramamurthi et al. (US 5,306,555).

As to claim 12, Ramamurthi teaches a gel matrix of monolithic aerogels reinforced with long or short fibers, whiskers, mineral wool, glass wool and particles (column 4, lines 1 – 20). Ramamurthi teaches the fibers may be randomly distributed or oriented and in the form of mats, sheets or nonwoven among other forms (column 4, lines 25 – 40). Ramamurthi notes that the composite gel matrix has good rigidity or flexibility based on the required application (column 2, lines 1 – 15).

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As to claims 6, 9 – 12 and 17 - 18, Ramamurthi discloses the claimed invention except for the lofty batting has a sufficient quantity of fibers in its z axis to provide loft yet not so many that the insulating properties are comprised by the z axis fibers acting as thermal conduits as required by claim 6, the dopant is present in an amount of 1 – 20% by weight of the total composite as required by claim 9, the cross-sectional area of the fibers of the batting visible in a cross-section of the composite is less than 8% of the total surface area as required by claim 10 or less than 10% as required by claim 12 of that cross section and the fibers have a cross-section of about 0.1 to 100 micrometers as required by claim 11, the batting has a density of about 0.1 to 16 lbs/ft<sup>3</sup> as required by claim 17, the batting has a density of about 2.44 to 6.1 lbs/ft<sup>3</sup> as required by claim 18. It should be noted that the quantity of fibers, amount of dopant, cross-sectional area of fibers visible and batting density are result effective variables. For example, as the quantity of fibers and density increases, the batting becomes more lofted. As the diameter of the fibers decrease, the material becomes more flexible. As the aspect ratio increases, the length in relationship to the diameter increases. As the amount of dopant increases, conductivity increases. As the visible cross-sectional area increases, the properties of the batting changes. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the lofty batting has a sufficient quantity of fibers in its z axis to provide loft yet not so many that the insulating properties are comprised by the z axis fibers acting as thermal conduits as required by claim 6, the dopant is present in an amount of 1 – 20% by weight of the total composite as required by claim 9, the cross-sectional area of the fibers of the batting visible in a cross-section of the composite is less than 8% of the total surface area as required by claim 10 or less than 10% as required by claim 12 of that cross section, the fibers have a cross-section of about 0.1 to

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100 micrometers as required by claim 11, the batting has a density of about 0.1 to 16 lbs/ft<sup>3</sup> as required by claim 17, the batting has a density of about 2.44 to 6.1 lbs/ft<sup>3</sup> as required by claim 18 since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the density, amount of fibers in the z axis, level of dopant, the size of the fibers, the aspect ratio and surface area of fibers to create a composite with the proper level of conductivity and loft.

As to claim 11, Ramamurthi teaches that the fibers can be of a wool variety (column 4, lines 10 – 20), which are known in the art to have crimp.

As to claims 13 - 14, Ramamurthi teaches that the aerogel matrix can comprise inorganic gel forming material such as TiO<sub>2</sub> (titania), SiO<sub>2</sub> (silica) and ZrO<sub>2</sub> (zirconia).

As to claims 15 – 17, although Ramamurthi does not explicitly teach the claimed batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 75% of its original thickness as required by claim 15 and compressible by at minimum of 65% and returns to at least 75% of its original thickness as required by claim 16 and 17, it is reasonable to presume that batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 75% of its original thickness as required by claim 15 and compressible by at minimum of 65% and returns to at least 75% of its original thickness as required by claim 16 and 17 is inherent to Ramamurthi. Support for said presumption is found in the use of like materials (i.e. lofted batting with aerogel and conducting fibers) which would result in the claimed property. The burden is upon the Applicant to prove otherwise. *In re*



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*Fitzgerald* 205 USPQ 594. In addition, the presently claimed properties would obviously have been present once the Ramamurthi product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to providing of this rejection made above under 35 USC 102.

***Response to Arguments***

11. Applicant's arguments with respect to claims 1 - 48 have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***

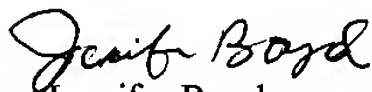
12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 571-272-1473. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jennifer Boyd  
May 22, 2004

  
**Ula C. Ruddock**  
Primary Examiner  
Tech Center 1700